DOCUMENT RESUME

ED 244 664 JC 840 250

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TITLE Audio Teleconferencing: Using Old Technology to Reduce Course Delivery Costs and Improve Services to Rural Students.
PUB DATE 29 May 84
NOTE 13p.; Paper presented at the Joint Conference of the Canadian Vocational Association and the Association of Canadian Community Colleges (Vancouver, British Columbia, May 28-31, 1984).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Budgets; *Distance Education; Educational Technology; Foreign Countries; Postsecondary Education; Program Costs; Program Development; *Program Implementation; Rural Education; *Teleconferencing; Telephone Communications Systems
IDENTIFIERS *Canada

ABSTRACT

A discussion is provided of the ways in which audio teleconferencing can provide instruction to students in rural areas using the regular telephone network. After introductory material describes the benefits of audio teleconferencing (e.g., its low costs, familiar technology, and wide availability), a technical description of its operation is provided. Next, an overview is presented of the use of audio teleconferencing by 40 postsecondary institutions in Canada, and the benefits identified by users are specified. Then, a three-phase operating model is offered for those wishing to institute a new audio teleconferencing service in their institution. For each phase, objectives and necessary steps are enumerated. These objectives are, for Phase 1, to develop enough interest in audio teleconferencing to justify moving from an experimental to an initial operational delivery mode; for Phase 2, to increase revenues from external contracts and special courses to recover a significant portion of dedicated system operating costs; and for Phase 3, to institutionalize audio teleconferencing so that it is a normal component of the methods used to reach students in remote areas. Finally, cost projections for the rental and purchase of equipment and a typical operating budget for an evening continuing education program are presented. (HB)

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AUDIO TELECONFERENCING

USING OLD TECHNOLOGY TO REDUCE COURSE DELIVERY COSTS AND IMPROVE SERVICES TO RURAL STUDENTS

presented at

Annual Conference of the
Association of Canadian Community Colleges
May 29, 1984

by

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JC 840 250

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AUDIO TELECONFERENCING

USING OLD TECHNOLOGY TO REDUCE COURSE DELIVERY COSTS AND IMPROVE SERVICES TO RURAL STUDENTS

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ABSTRACT

Audio teleconferencing using the regular telephone network is a rapidly growing method of reducing communication costs and improving the quality of service to distant centers. Government, industry and educational institutions are all finding applications of audio teleconferencing that benefit their organizations and clientele. Audio teleconferencing can be of special interest to educational institutions that serve students in small, widely dispersed communities. Instructors who use audio teleconferencing find students can learn as effectively by telephone as in a regular classroom. In addition, students tend to find their instructors better prepared for teleconferencing classes and meetings than in regular classes. The number of organizations using audio teleconferencing on a regular basis is growing rapidly because of clearly documented benefits and financial savings.

INTRODUCTION

In the 1980s, educational institutions increasingly are turning their attention to the needs of the distant learner (Knowles, 1984). The variety of approaches ranges from correspondence courses, travelling instructors, audio teleconferencing, and radio, to satellite-delivered television. Each has its own special advantages, appeal and problems. In North America audio teleconferencing has had a growing appeal over the last few years because:

- it uses familiar technology;
- it has relatively low start-up and operating costs;
- it is widely available;
- it can be used for very small groups as well as for several hundred students;
- it is interactive;
- the instructor is in control;
- it can have immediate cost savings;
- it can be implemented quickly;
- it has the potential for generating operating profits;
- access to programming can be controlled.

TECHNICAL DESCRIPTION

Teleconferencing is the bringing together by electronic means of three or more people in two or more locations to share a common discussion. Teleconferencing includes the use of two-way and one-way video, (both full motion and slow scan) electronic blackboard, facsimile, computer graphics, radio, satellites, and telephones. The most essential portion of all effective teleconferencing is good quality audio. Without audio, teleconferencing loses its main strength, which is the immediate interaction of the participants for the exchange of information. Except for special applications, the visual portions of teleconferencing, such as in multi-point video conferences, have been judged to contribute relatively little additional essential information and their very large costs cannot be justified. Audio teleconferencing is the current choice of most users because it is effective and cost efficient.

Audio teleconferencing requires a multi-line inter-connection device called a bridge to which the user can attach a wide variety of telephone send/receive equipment. The normal limitation is one device per line connected into the bridge. Typical types of equipment are regular handsets, speakerphones, headsets, and microphone speaker units often called conveners. Audio teleconferencing uses regular lines provided by the local telephone company including dedicated, normal business, local, or long distance lines. Although conferencing can originate from almost any reasonably quiet environment, long term users normally acoustically treat separate rooms to reduce overall noise in the system. Occasional users of teleconferencing normally purchase their services from the local telephone company or teleconferencing consultant. The telephone companies normally lease time on their bridges on a per minute basis with a surcharge made for each line used. Any specialized terminal equipment is normally leased by the month. Training in the use of the equipment and in making efficient use of the teleconference is not normally supplied. Teleconferencing consultants will usually provide a range of services including all the necessary equipment and training for a flat fee plus any telephone toll charges. Heavy users of audio teleconferencing normally buy their own bridges which can be connected into private telephone exchanges or directly into additional business lines that by-pass the exchange. Serious users of teleconferencing will select dedicated rooms that have a height to width to length ratio of approximately 1 to 1.5 to 2.5. In addition, the walls may be adjusted so that they are no longer parallel or at right angles. The walls should be covered with sound absorbing materials but the ceiling and floor left somewhat hard (Botros, 1984). The telephone terminal equipment installed in each room should provide for generally hands-free operation. Many organizations will install optional facsimile machines in each center.

CURRENT CANADIAN USE

In a national survey conducted in 1983 (Knowles, 1984), forty Canadian post-secondary educational institutions indicated they were using or

planning to use audio teleconferencing primarily for delivery of professional continuing education. The most common reasons given for their interest were to cut travel costs and to improve services to small groups in remote areas. Resistance of faculty to use telephones for delivery of instruction was not considered to be a likely deterrent. During the 1983/1984 academic year an informal consortium of BCIT, the Open Learning Institute, Simon Fraser University, the University of Victoria, and the University of British Columbia used audio teleconferencing to provide 467 hours of instruction and reach approximately 3,800 students (Robertson et al, 1984). The Ontario government used teleconferencing to reduce travel costs and managerial time in an experiment conducted between 1979 and 1982. Over 18 months in 1979/1980 the Ontario Ministry of Transportation and Communications saved $49,000 in travel and 2,078 hours on managerial time (Cukier, 1984). In a further 26 months, the Ministry of the Environment saved an average of $2,000 per month in travel and time. The level of satisfaction of Ontario Government employees with audio teleconferencing was generally very high. In 1983 the Bank of Montreal began using audio teleconferencing and quickly demonstrated travel and time savings. More importantly they discovered they were able to improve communications and produce more informed decisions (McGibbon, 1984). All users have concluded that teleconferencing is not a substitute for all meetings but is very effective for information exchange.

Benefits usually identified by users are:

- travel savings
- time savings
- reduced staff stress
- quicker and more informed decisions
- increased programming to remote sites
- new services provided to small class groups
- reduced course fees for remote students
- improved planning of course materials
- reduced costs per student contact hour for remote students
- improved communication skills in presenters.

OPERATING MODEL FOR NEW EDUCATIONAL USERS

Potential users of audio teleconferencing should not consider it simply as a money-saving replacement for some of their current activities. It is true that audio teleconferencing is a technique that dispersed organizations can quickly employ to reduce their overall operating costs. To gain the maximum benefits of audio teleconferencing most users have had to modify to varying degrees how they prepare and handle the activity that is conducted over the telephone. In particular, educational users should consider audio teleconferencing only as a portion of an integrated learning system. The elements of that system are:

- instructor
- print package
- visuals, including slides, overheads, film and video
- site coordinators or teaching assistants
- audio teleconferencing system.

It is a mistake to assume that if a good audio teleconferencing system is provided all the other elements of the learning system can be transferred directly from the conventional classroom instruction system. Some short but specialized instruction will be required for most instructors and class handouts and print packages will have to be prepared more carefully and earlier than is normal for on-site classrooms.

Successful audio teleconferencing services generally develop in three phases with slightly different objectives at each phase. The following guidelines are provided for those who may wish to institute a new audio teleconferencing service in their institution.

Phase 1

Objective: to develop enough interest in audio teleconferencing to justify moving from an experimental to an initial operational delivery mode.

1. Identify potential local or regional sources of bridge and station equipment.

2. Select a professional or special need group normally associated with your institution and having a widely scattered membership.

3. In cooperation with the administrative members of that group, identify some discrete educational needs of the group's members.

4. Based on the population distribution of the membership and the potential for inter-institutional cooperation, select approximately 8 to 10 potential receive sites.

5. Create a budget and have it approved in principle by the necessary authorities within your institution.

6. Adapt or prepare an appropriate program to serve the identified group needs.

7. Review your plans with a successful educational audio teleconference user.

8. Book bridge and equipment time.

9. Train your instructors and site coordinators.

10. Advertise the program using the association and other interested parties where possible.

11. Deliver the program as planned, even if registrations do not appear large enough to recover your direct costs.

12. Evaluate the program paying particular attention to your instructor effectiveness and the general acceptance of the students to audio teleconferencing as a delivery technique.

13. Design and deliver another program incorporating any suggestions made by the students in the first program. Where possible, direct some follow-up programming to previous users.

Phase 2

Objective: To increase revenues from external contracts and special courses to recover a significant portion of dedicated system operating costs.

Moving to the next phase of the operation assumes that the first courses were generally successful and that enough external users such as professional groups or neighboring institutions have expressed interest in using audio teleconferencing that the revenue from those users could be used to cover the majority of the continuing rental of such things as telephone lines and on-site teleconferencing equipment. If that is a reasonable assumption to make, the next steps are:

1. Confirm the level of interest from potential partners who would be willing to use a conferencing system operated by your institution.

2. Buy or lease a ten-line teleconferencing bridge and install it in your facilities.

3. Buy or lease terminal equipment for the most heavily subscribed remote sites that would be served the majority of the time and speakerphones for less commonly used sites.

4. Install eleven business lines external to the on-site exchange if one exists. The eleventh line is used as a direct trouble line into the bridge control area.

5. Assign one full-time, well organized clerical coordinator and have on call technical assistance.

6. Increase the number of potential instructors and provide training as required.

7. Enrich on-site classes by using the teleconferencing system to bring in external experts by telephone.

8. Follow the program strengths identified in phase 1.

9. Develop new markets in cooperation with new professional associations.

Phase 3

Objective: To institutionalize audio teleconferencing so that it is a normal component of the methods used to reach remote students.

When the revenue base from teleconferencing is large enough to recover all the extra system operating costs, or as in some cases to have a net profit, the system can be shown to operate effectively, there is a good selection of instructors and programs, and there is a good potential market then audio teleconferencing would generally find a place in regular institutional activity. Some of the steps required to institutionalize it are:

1. Build student confidence in the institutional commitment to audio teleconferencing by developing programs of several years duration.

2. Expand post-basic course offerings to new student groups.

3. Include some new types of classes including carefully selected under-graduate courses.

4. Explore joint programming possibilities with other institutions so that you can be a receiver as well as a provider of programs.

5. Create a teleconferencing users group to explore ways of increasing the use of the technique.

6. Experiment with add-ons such as facsimile and Telidon.

7. Continue to evaluate the effectiveness of the instructors, programs, and the system.

8. Adjust your operating methods as required to serve new student populations and the instructional requirements of new courses.

COST PROJECTIONS

The following assumptions are made:

1. The organization considering audio teleconferencing is an educational institution with responsibilities for a region at least 50 by 300 miles in area, having one to two population centers over 10,000, three to five centers over 5,000 and many pockets of population between 2,000 and 5,000.

2. The on-site population of the main campus is approximately 1,000 in day school programs and 5,000 in continuing education programs.

3. The main site of the institution is not the major population center of the province.

4. Education delivery to secondary sites is an institutional issue and concern.

5. Some programming capacity for external students exists, probably within the continuing education unit.

6. Senior personnel in the institution support using new methods to reach out to remote students.

7. Some budgetary support for experimentation in audio teleconferencing is possible.

8. Some audio teleconferencing services are already available within the province and that to successful users on a consulting basis is possible.

	Rental	Purchase
Telco Teleconference	18¢/line/minute plus long distance toll charges	---
10-line bridge (private)	$8 to $25/line/hour	$6,000 to $60,000
Speakerphones	$15 to $30/month	$120 to $300
Terminals (4 microphones plus speaker)	$90 to $120/month	$900 to $1,600
Business line	$40 to $60/month	---
Long distance charges/minute		
Within Province		
Day rate DD	46¢ to 65¢	
Weekend and evening DD	30¢ to 42¢	
Night rate DD	18¢ to 25¢	
Outside Province		
Day rate DD	80¢ to $1.05	
Weekend and evening DD	52¢ to 62¢	
Night rate DD	32¢ to 42¢	
Inwats (within province)	70¢/minute for first 10 hours 59¢/minute each extra minute	

Outwats (within province)	63¢/minute for first 10 hours 50.5¢/minute for each extra minute

The following is a planning budget for a typical evening professional continuing education program in British Columbia:

Origination Site	BCIT (Vancouver)	16
Receive Sites and Registrants	Kamloops	12
	Prince George	10
	Fort Nelson	6
	Kitimat	9
	Fernie	8
	Tofino	5
	Merritt	7
	Hope	6
	Castlegar	13
		92

Duration	2 hours/session for 6 sessions
Fee	$60
Projected Revenue	$5,520
Long Distance Charges	$3.36/min. x 750 min.
	$2,520
Production of print packages	$85
Bridge time	$840*
Instructional Costs	$600
Terminal equipment Shipping costs	$320
	$4,365
Break-even registrations	73

*Contains lease or amortization costs.

If the projected registrations are confirmed, the total cost per SCH will be $3.95.

In comparison, to deliver the same course to the same centers with a travelling instructor, the estimated cost for a 1 1/2 day course in each of the ten sites is:

Instruction	10 x $600	$6,000
Travel		1,890
Accommodation		500
Materials		85
		$8,475
Staff Travel Time		65 hours

SUMMARY

Audio teleconferencing is initially seen by budget conscious administrators as a method of reducing travel expenses. While immediate savings are possible for dispersed organizations it is normal to find communications quality has increased. Educational institutions are able to serve smaller markets than is possible with travelling instructors and instructors can make more efficient use of their time. The requirements of audio teleconferencing as an educational communication system tends to encourage instructors to improve the quality of their instructional materials.

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BIOGRAPHICAL DATA

William D. Robertson is the head of the Distance Education Department at the British Columbia Institute of Technology. He has worked in various areas of distance education since 1974. He was project manager for BCIT's experiments on the Hermes satellite and managed the B.C. Interactive Instructional Television Program on ANIK-B in 1979 and 80. He has been responsible for the BCIT teleconferencing system since 1982.

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